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USSR Report

CHEMISTRY

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ADSORPTION

UDC 543.422.541.183.5

STUDY OF METHANE ADSORPTION ON η - Al_2O_3 BY IP-SPECTROSCOPIC METHOD IN DIFFUSE-SCATTERED LIGHT

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 284, No 2, 1985
(manuscript received 24 Sep 84) pp 391-394

MUZYKA, I. S., ZUBKOV, S. A., BOROVKOV, V. Yu. and KAZANSKIY, V. B.,
corresponding member, USSR Academy of Sciences, Institute of Organic
Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences, Moscow

[Abstract] Reaction of methane (deuteromethane) with the surface of η - Al_2O_3 catalyst was studied by a highly-sensitive, IR spectroscopic method in diffusely scattered light in the range of $2000\text{--}4000\text{ cm}^{-1}$. η - Al_2O_3 was pretreated in vacuum at 970K and 10^{-2} H/m^2 for 2-3 hrs. In addition to molecular adsorption centers of methane (deuteromethane), centers of its dissociative adsorption were noted on the surface of thus treated η - Al_2O_3 . Passage of CD_4 over η - Al_2O_3 at room temperature generated bands at 2706 and 2240 cm^{-1} in their IR spectra, related to valence vibrations of the OD group and CD_3 fragment formed during dissociation of CD_4 . Because of a strong background adsorption, no dissociation of CH_4 could be observed. Reacting with CO_2 molecules, the OH and OD groups converted to surface bicarbonates which are inactive in the H-D exchange with hydrogen and methane. Thus it was shown that various centers of molecular and dissociative adsorption of methane exist on dehydroxylated surface of Al_2O_3 . The acid-base pairs Al^+O^- appear to be the centers of molecular adsorption on which the polarization of CH bonds of the adsorbed CH_4 molecules takes place. During dissociative adsorption, OH groups are formed participating in H-D exchange at room temperature with molecular deuterium and deuteromethane. Figures 4; references 7: 3 Russian, 4 Western (1 by Russian authors).
[20-7813]

NOVEL SIMPLE METHOD FOR PREPARATION OF ADSORBENTS WITH HYDRAZIDE GROUPS FROM HYDROXYL GROUP CARRIERS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 282, No 6, 1985
(manuscript received 19 Jul 84) pp 1395-1397

KLYASHCHITSKIY, B. A., MEZHOVA, I. V., POZDNEV, V. F. and SHVETS, V. I.,
Institute of Biological and Medical Chemistry, USSR Academy of Medical
Sciences, Moscow

[Abstract] A novel and simple approach was devised for the preparation of adsorbents with hydrazide groups by modifying hydroxyl-group-containing carriers with methoxycarbonyl chloride (MCC), and subsequent hydrazinolysis. In the case of modification of Sepharose CL-4B (Pharmacia, Sweden), modification with MCC was carried out for 0.5-1 h at 4°C; subsequent treatment with hydrazine hydrate was carried out at 20°C for 2-5 h. The gel was washed with 0.1 M hydrochloric acid and distilled water, and stored at 4°C in 0.02% NaN_3 . The final Sepharose CL-4B product contained 135 μmoles of hydrazide groups per 1 g of the dry gel. Similar procedures were applied to other carriers (Sepharose 4B, Sepheron 300, Toyopal HW-55), yielding carriers with up to 320 μmoles of hydrazide groups per 1 g of the dry gel. In addition to the ease of preparation, this approach avoids the use of such toxic agents as cyanogen bromide. Figures 1; references 12: 2 Russian, 10 Western.
[007-12172]

GLUTAMIC ACID BINDING BY SULFONATED CATION EXCHANGERS

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 8, Aug 85
(manuscript received 29 Sep 83) pp 1992-1995

SELEMENEV, V. F., MIROSHNIKOVA, Z. P., OGNEVA, L. A., YERMAKOVA, I. I.,
KOTOVA, D. L. and OROS, G. Yu., Voronezh State University imeni Komosomol

[Abstract] An analysis was conducted on the chemical parameters of glutamic acid (GA) binding by a sulfo-group containing cation exchangers differing in physical structure--KU-2X8, a gel, and KU-23 a microporous cationite. IR analysis of the elution pattern of the anion GA^{2-} was conducted at pH 12.2, and for the zwitter ion GA^+ at pH 3.22-3.45. The studies with GA^{2-} adsorption showed that eluate first contained sodium prior to the appearance of GA in the eluate, indicating redistribution of GA and sodium ions in the ion exchange phase, and that under selected conditions sodium ions can replace GA from the resin. Resolution of the Na and GA ions was more complete with KU-23 columns than with KU-2X8 chromatography, due to the fact that the aqueous phase of KU-23 retained 1.3-fold more GA than was retained in the aqueous phase of KU-2X8 at 25°C. Adsorption

of GA^+ was largely due to proton exchange between the SO_3H groups of the ion exchanger and the ionized carboxyl groups of GA, and between the SO_3^- groups of the exchanger and the NH_3^+ groups of the GA. Figures 2; references 6 (Russian).
[013-12172]

UDC 546.27'161:661.183.2

ADSORPTION OF BORON TRIFLUORIDE TO ACTIVATED CHARCOALS BAU AND SKT-2 AND ZEOLITE NaA

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 8, Aug 85
(manuscript received 17 Oct 83) pp 2011-2015

POLEVOY, A. S. and BORISENKO, A. N., Moscow Institute of Chemical Technology imeni D. I. Mendeleyev

[Abstract] An analysis was conducted on the adsorption isotherms of BF_3 to activated charcoals BAU and SKT-2 and the zeolite NaA over the temperature range 231-322°K and pressures varying from 0 to 10^5 Pa, with a view toward selection of optimal adsorbent for BF_3 concentration. Dubinin's equation was used to relate adsorption to sorbent structure, temperature, pressure and operative time, with the various parameters summarized in tabular and graphical forms. In the final analysis compressor apparatus employing SKT-2 was found to be 2-3 times as productive in BF_3 recovery as methods relying on BAU or NaA, and utilized 2- to 3-fold less energy for the concentration of a unit volume of the gas. Figures 2; references 28: 15 Russian, 13 Western.
[013-12172]

/9835

UDC 678.5.072.01:84.028

ULTRASOUND-BASED METHOD FOR STUDIES ON COMPRESSION MOLDING KINETICS OF PLASTICS

Moscow PLASTICHESKIYE MASSY in Russian No 6, 1985 pp 60-61

TAGIYEV, E. A., RASKIN, Ye. B. and TRIZNO, M. S.

[Abstract] Technical details are presented on an ultrasound-based method for measuring the kinetics of compression molding of plastics. The essential design consists of a standard chamber with a plunger that functions simultaneously as a wave guide. Compression is achieved with a magnetostriction transformer, with a potential difference created by leads imbedded in the plunger and the bottom of the chamber. Changes in the current passing through the plastic material is recorded on an oscillograph. The method allows for continuous monitoring of solidification through the introduction of ultrasonic waves into the compression zone. Figures 1; references 2 (Russian).
[6-12172]

UDC 678.5:543.84.08

APPLICATION OF CHN-2 ANALYZER IN DETERMINATION OF ELEMENTAL COMPOSITION OF ORGANIC POLYMERS

Moscow PLASTICHESKIYE MASSY in Russian No 6, 1985 pp 43-45

ZIGEL, A. N., RYABIKOVA, V. M., UTKINA, O. G. and KORZHOVA, I. T.

[Abstract] Statistical analysis was conducted on the results of elemental analysis of certain simple and polymeric organic substances, using the CHN-2 analyzer for combustion analysis. Tabulated data are presented on the analysis of acetanilide, cystine, phenacetin, polyvinyl chloride, polystyrene, polyethylene, and styrene-acrylonitrile copolymer, giving the arithmetic mean, root mean square error, and precision at 95% reliability limit. The poor reproducibility of the determinations of carbon, hydrogen

and nitrogen in the case of the polymers is ascribed to heterogenous combustion conditions of intermediate, heat stable, low MW compounds, e.g., CO_2 and CH_4 . In addition to such products which are refractory to oxidation, the decomposition of some polymers, e.g., polystyrene, is a highly endothermic depolymerization process that in itself limits the degree of combustion of the sample. Figures 2; references 10: 9 Russian, 1 Western.
[6-12172]

/9835

INTERACTION OF PROTEINS WITH COLLOIDAL GOLD

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 284, No 3, 1985
(manuscript received 25 Oct 84) pp 638-641

ULBERG, Z. R., OVCHARENKO, F. D., academician, Ukrainian SSR Academy of Sciences, KARAMUSHKA, V. I., PODOLSKAYA, V. I., GRUZINA, T. G. and PERTSOV, N. V., Department of Natural Dispersion Systems, Institute of Colloid Chemistry and Water Chemistry imeni A. V. Dumanskiy, Ukrainian SSR Academy of Sciences, Kiev; Moscow State University imeni M. V. Lomonosov

[Abstract] Electron microscopy and filtration through Synpore filters (0.17 μ m diameter) of colloidal gold-protein mixtures was used to assess interaction between particles of gold and the proteins. The interaction of the proteins with the colloidal gold particles was of a specific nature, including electrostatic and chemisorptive binding. On the basis of behavior with respect to colloidal gold, the proteins were divided into three groups. The nonreactive proteins included human serum albumin and soybean trypsin inhibitor, which was ascribed to their isoelectric points in the pH 4.5-4.9 range and their net negative charge under the experimental conditions (pH 7.6). Flocculation was obtained with trypsin, papain, and pancreatic RNase (pI 7.9-11.0); however, higher concentrations of these proteins did not lead to system stabilization. A third group was represented by lysozyme, which behaved as a typical high MW flocculant leading to stabilization and large aggregates. In addition to adsorptive mechanisms, the importance of chemical groups such as SH was demonstrated by the effects of PCMB, which markedly reduced the flocculation efficiency of the active proteins. Interaction of the gold with proteins also led to its ionization and the formation of electron-dense connecting bridges between the complexes. Figures 3; references 3 (Russian).
[038-12172]

CALCULATIONS OF GEOMETRIC AND ELECTRONIC STRUCTURE OF Mg-PORPHYRIN COMPOUNDS FROM OPTIMAL sp^d BASIS FUNCTIONS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 282, No 6, 1985
(manuscript received 24 Jul 84) pp 1437-1441

MAMAYEV, V. M., GLORIOZOV, I. P., ORLOV, V. V. and BABIN, Yu. V.,
Moscow State University imeni M. V. Lomonosov

[Abstract] Quantum mechanical calculations were employed to construct a molecular and electronic model of Mg-porphyrin systems that could provide more definitive insight into the photosynthetic apparatus. The mathematical approach taken was based on the recognition that an adequate description of the electronic structure of molecules incorporating third period atoms demands inclusion in the atomic basis of vacant 3d orbitals. Numerical analysis demonstrated that using $\int 3s, ep(Mg) = 1.18$ and selecting $\int ed(Mg)$ from the minimal full energy of the Mg-porphyrin molecule, leads to calculated structural parameters that are in full agreement with experimental data. The calculations demonstrate that the Mg-porphyrin complex represents a labile structure, and that this approach appears to be applicable to other third group elements, such as phosphorus. Figures 4; references 15: 6 Russian, 9 Western.
[007-12172]

PROTON INVOLVEMENT IN ELECTRON TRANSFER IN NITROGENASE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 282, No 6, 1985
(manuscript received 7 Aug 84) pp 1445-1449

SYRISOVA, L. A., KHRAMOV, A. V., UZENSKAYA, A. M., LIKHTENSHTEYN, G. I., MORAVSKIY, A. P. and SHILOV, A. Ye., corresponding member, USSR Academy of Sciences (AS), Department of the Institute of Chemical Physics, USSR AS, Chernogolovka, Moscow Oblast

[Abstract] In order to test the hypothesis that protonation is involved in nitrogenase activity, studies were conducted concerning the effects of a series of phenols known to uncouple oxidative phosphorylation and to react with protons on membrane surfaces. Of the agents tested (phenol, o-chlorophenol, dinitrophenol, pentachlorophenol), pentachlorophenol exhibited the greatest inhibitory activity on *Azotobacter vinelandii* nitrogenase in terms of electron transfer from the Fe-protein to the Mo-Fe-protein. In addition, pentachlorophenol was shown to inhibit the dithionate-dependent ATPase activity of nitrogenase, but not its dithionate-independent activity.

The effects of pentachlorophenol were, therefore, directed at the functional site of the redox system of the enzyme, and not at the ATPase active site. Since maximum inhibitory activity was shown by a phenol derivative with a $pK_a = 5.6$, i.e., pentachlorophenol, and the degree of inhibition was pK -dependent, it appears that blockage of the proton flow abolishes both the electron transfer and ATP hydrolysis. Figures 3; references 13: 9 Russian, 4 Western.
[007-12172]

UDC 634.0.813.2:581.192.2

CONVERSION OF PROSTAGLANDIN E INTO PROSTAGLANDIN A DURING ISOLATION FROM LIVING HIGHER PLANT TISSUES

Riga KHIMIYA DREVESINY in Russian No 4, Jul-Aug 85
(manuscript received 8 Jan 85) pp 110-111

SEDLOVA, T. O., ZIMOVTSOVA, I. A. and LEVIN, E. D., Siberian Technologic Institute

[Abstract] TLC and GLC techniques were used to monitor the isolation of PGE from the living tissues of higher plants, in order to determine the effects of pH on PGE yield. The data showed that a minimum pH of 3.5 must be adhered to, since at lower pH values--as often happens in such isolations--PGE undergoes transformation into PGA. Under conventional conditions of isolation approximately 45.4% of PGE undergoes oxidative degradation and, concomitantly, the concentration of PGA increases by 33.6%. Figures 1; references 5: 1 Russian, 4 Western.
[39-12172]

/9835

CATALYSIS

MANY FACES OF CATALYST

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 11 Oct 85 p 2

[Article by N. Ilinskaya]

[Excerpt] Discovery No. 306 was recorded yesterday by the USSR State Committee on Inventions and Discoveries. This discovery, which is in the field of catalysis, was made at the USSR Academy of Sciences' Institute of Chemical Physics. Its authors are S. Roginskiy, corresponding member of the USSR Academy of Sciences, and doctors of chemical sciences L. Ya. Margolis, O. V. Krylov and O. M. Todes.

For a long time it was thought that the activity of a catalyst could be lowered or heightened with the aid of certain addition agents. Addition agents were even strictly classified as inhibitors--which 'toxify' a catalyst like poisons and slow down reactions--or promoters--which heighten a catalyst's activity.

Studying the mechanism of catalysis, the researchers encountered an unknown phenomenon which contradicted the accepted classification. It was found that the whole thing depends on the concentration of additives and the temperature at which the process takes place. Under certain conditions, an accelerator-additive can act as a catalytic poison. And, conversely, an inhibitor is capable of making a reaction more active. The scientists formulated a general theory which explains this ambiguity.

This discovery is of great scientific importance; the mechanism by which additives affect the activity of catalysts has been explained, and a basis has been provided for heightening the selective action of chemical processes. The synthesizing of highly effective catalysts and the development of processes for their production are practical applications of the discovery.

The scientists of the USSR Academy of Sciences' Institute of Chemical Physics did the basic research and studied practical problems simultaneously. This combination proved productive: 14 inventions have been made on the basis of the discovery. They have been patented in the German Democratic Republic, Romania, Poland, Italy, France and the Federal Republic of Germany. Among them are highly effective catalysts for synthesizing polymers and oligomers, and for more thorough refining of petroleum.

FTD/SNAP/9835
CSO: 1841/63

UDC 66.094.37:[661.7:547.265]661.7:547.295.1-31

OXIDATION OF ISOAMYL ALCOHOL OVER SILVER CATALYSTS

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 7, 1985 pp 392-395

ALKHAZOV, T. G. and MANUCHAROVA, L. A.

[Abstract] Silver catalysts are used in the oxidation of many alcohols to corresponding aldehydes. Alkaline additives to the catalysts are used to oxidize higher alcohols. To explain the role of the alkaline additives, silver catalysts were studied with varying content of alkali. It was shown that addition of alkali shifts the optimal performance of the catalyst towards higher temperatures and affects a number of side reactions so that the selectivity of this process is increased. In general, it was shown that current production processes could be improved in various ways: strict limitation of the concentration of isovaleric aldehyde and isovaleric acid in the recycling alcohol; decreased free volume of the reactor over the catalyst; and addition of steam to the reactor. Addition of 65-70% of steam to the reactor leads to increased yields of aldehyde and selectivity of the process up to 85-98% at the same level of productivity, based on the alcohol used in the process. Figures 3; references 8 (Russian). [9-7813]

UDC 678.742.3:66.095.2

EFFECTS OF ADMIXTURES IN DIETHYLALUMINUM CHLORIDE ON PROPYLENE POLYMERIZATION

Moscow PLASTICHESKIYE MASSY in Russian No 6, 1985 pp 12-13

MAYER, E. A., SHEVCHENKO, S. A., NEKHOROSHEV, V. P., CHERNIKOV, V. B. and IVANCHEV, S. S.

[Abstract] An analysis was conducted on the effects of impurities in diethylaluminum chloride (DEAC) on the activity and stereo-specificity of catalytic systems in the synthesis of polypropylene. With a Cl:Al ratio in the 1.32-1.40:1 range the DEAC + $TiCl_3$ catalytic system shows optimal efficiency when modified with up to 50% diisoamyl ether, in comparison with

the unmodified catalyst. The yield of atactic polypropylene in this Cl:Al range is insignificant, with the concentration of the isotactic polypropylene fraction approaching 98.3%. An increase in the Cl:Al ratio results in loss of efficiency of the unmodified catalytic system and in systems modified with methyl methacrylate. However, the presence of diisoamyl ether mitigates the effects of elevation of the Al:Al ratio (1.4-1.49:1), presumably due to active complex formation with DEAC. Figures 1; references 4 (Russian).
[6-12172]

UDC 542.971.2:547.551.2

HYDROGENATION OF NITROCHLOROBENZENES OVER HETEROGENOUS METAL-POLYMER CATALYSTS

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 8, Aug 85
(manuscript received 6 Jun 84) pp 2063-2065

KLYUYEV, M. V., POGODINA, T. B. and YERYKALOV, Yu. G., Ivanovo State University

[Abstract] A study was conducted on the effects of anthraquinone addition to Pd-polymer catalysts on polyethylene support on the rate and selectivity of hydrogenation of isomeric nitrochlorobenzenes. Addition of anthraquinone was seen to enhance both the rate and selectivity. The optimum molar ratio of anthraquinone to Pd was 1.5. In the case of hydrogenation of p-nitrochlorobenzene at 50°C the rate constant of the system catalyzed by Pd-poly-4-vinylpyridine doubled on supplementation with anthraquinone, while the selectivity for p-aminochlorobenzene improved from 30.6% to 74.6%. Figures 1; references 4 (Russian).
[013-12172]

UDC 546.73.14+547.2.288

COMPOSITION OF COBALT-BROMIDE COMPLEX IN p-XYLENE-DIMETHYLFORMAMIDE MIXTURE

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 8, Aug 85
(manuscript received 19 Sep 83) pp 1929-1932

KOZHAROVA, L. I., SHIK, G. L. and SHAKHTAKHTINSKIY, T. N., Institute of Theoretical Problems in Chemical Technology, Azerbaijan SSR Academy of Sciences, Baku

[Abstract] Spectrophotometric studies were conducted on the composition of cobalt-bromide complexes formed in a mixture of p-xylene and dimethylformamide at 130°C for 5 h. The ratio of $\text{Br}^-/\text{Co}^{2+}$ was found to vary with the concentration of dimethylformamide, with the ratio value decreasing as the

concentration of dimethylformamide decreased. The value of $\text{Br}^-/\text{Co}^{2+}$ falls to a minimum of 4 when the concentration of dimethylformamide is reduced to 20 wt%, indicating that the maximum coordination number of Br^- is 4. Analysis of the spectral data indicated that the $[\text{CoBr}]^+$ complexes are octahedral, while the $[\text{CoBr}_2]$, $[\text{CoBr}_3]^-$, and $[\text{CoBr}_4]^{2-}$ complexes are tetrahedral in structure. Figures 4; references 10: 9 Russian, 1 Western.
[013-12172]

UDC 541.128

KINETICS OF CATALYTIC HYDROGENATION OF CARBON BLACK PM-100

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 8, Aug 85
(manuscript received 4 Oct 83) pp 1941-1945

USHAKOVA, G. I., SEROV, Yu. M. and SHIRYAYEV, V. K.

[Abstract] Determinations were made of the kinetic parameters characterizing the hydrogenation of carbon black PM-100 (sp. surface area ca. $100 \text{ m}^2/\text{g}$) and PM-15 (sp. surface area ca. $15 \text{ m}^2/\text{g}$) over platinum at $973\text{--}1123^\circ\text{K}$. Maximum rate constants were seen with 0.3 to 1.2% platinum, indicating that with those platinum concentrations the entire surface area of the metal was catalytically involved. Methane had no effect on the hydrogenation process. The apparent energy of activation for both types of carbon black was calculated as $38 \pm 3 \text{ kcal/mole}$ from Arrhenius plots. Since the true energy of activation estimated at $63 \pm 2 \text{ kcal/mole}$ is quite close to the carbon-platinum binding energy (64.5 kcal/mole), it appears that the limiting step in the hydrogenation is the rate of transfer of the hydrogen atom across the platinum-carbon interface. Figures 4; references 13: 6 Russian, 7 Western.
[013-12172]

CATALYTIC ACTIVITY OF TRIPHASIC COCRYSTALLIZED SYSTEM OF HIGH-SILICON ZEOLITES

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 8, Aug 85
(manuscript received 30 Sep 83) pp 1937-1940

YUSHCHENKO, V. V., TOPCHIEVA, K. V. (deceased), MEGED, N. F.,
TRUNOVA, V. I. and MEGED, A. A., Chemistry Faculty, Moscow State
University imeni M. V. Lomonosov

[Abstract] Triphasic cocrystallized zeolite (TPCZ), prepared from granulated silicagel in alkaline aluminate solution containing sodium and tetraethylammonium cations, was tested for its efficiency in cracked n-octane and for acidity by ammonia thermodesorption. The studies with TPCZ, consisting of 30% mordenite, 30% ZSM-5, and 40% ZSM-12, showed that the initial cracking activity falls during the first hour to a plateau with a rate constant of 3 $\mu\text{moles/g}\cdot\text{sec}$ at 450°C, which is markedly below that of biphasic cocrystallized zeolite and ultrasil. After cooling and activation with hydrogen at 450°C there was no decrease in the activity of TPCZ, although the activity was below that of fresh TPCZ. The desorption curve for TPCZ was below that for ultrasil, H-mordenite, and the biphasic zeolite. Tabulated data on the conversion products obtained with TPCZ showed time-dependent changes in the products, with fresh TPCZ initially forming 420 moles of methane per 100 moles of n-octane, a figure which eventually dropped to 141 moles of methane. In terms of yields of C₂ to C₅ hydrocarbons, TPCZ differed from the other zeolites, a difference which was ascribed to ZSM-12. Figures 2; references 6: 4 Russian, 2 Western.
[013-12172]

UDC 66.012.46

CONSOLIDATION OF NICKEL PARTICLES IN HYDROCARBON CONVERSION CATALYSTS

Kiev KHIMICHESKAYA TEKHOLOGIYA in Russian No 4, Jul-Aug 85
(manuscript received 15 Feb 85) pp 20-22

DENBNOVETSKAYA, Ye. N., FEDCHENKO, L. Yu. and VESELOV, V. V., Gas
Institute, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] Several Soviet and imported catalysts used for the conversion of hydrocarbons were analyzed for the status of Ni in relation to loss of catalytic activity after prolonged periods of use. A common feature of all the studied catalysts--GIAP-8 ($\alpha\text{-Al}_2\text{O}_3$, Ni), KSN-2 ($\alpha\text{-Al}_2\text{O}_3$, Ni, $6\text{Al}_2\text{O}_3\cdot\text{CaO}$, MgAl_2O_4) and S-11-9--consisted of consolidation of surface nickel particles into spherical elements. The changes evident in scanning electron microscopy were identical for each sample, and suggested a fundamentally similar process. The increase in the size of the Ni

spherules was seen to occur in the first two to three years of use; thereafter the process became stabilized and the spherules remained about 1 μ m in size. Despite the decrease in the Ni surface area on the total catalyst surface, residual activity was due to conversion reactions occurring within the Ni granules. Figures 2; references 6 (Russian).
[5-12172]

UDC 542.97:661.183.6:547.281.4

METAL-ZEOLITE M^{1+} NaX SYSTEMS AS BIFUNCTIONAL CATALYSTS OF BUTYRIC ALDEHYDE HYDROCONDENSATION

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 284, Sep-Oct 85
(manuscript received 5 Oct 84) pp 145-149

ISAKOV, Ya. I., MINACHEV, Kh. M., academician, and ISAKOVA, T. A.,
Institute of Organic Chemistry N. D. Zelinskiy, USSR Academy of Sciences,
Moscow

[Abstract] Results obtained during conversion of butyric aldehyde and H_2 by catalysts including M^{1+} NaX zeolites are presented and discussed. Catalysts were prepared from crystallites studied in crotonic condensation of butyric aldehyde. On group VIII metals- M^{1+} NaX zeolite catalysts, interaction of butyric aldehyde with H_2 goes with formation of 2-ethylhexanal and isooctanol. On Pt-, Rh- and especially Ni- and Co-systems, butanol is formed in considerable quantities in addition to 2-ethylhexanal and isooctanol. Rh/NaX, under the same conditions of the process, forms more 2-ethylhexanal than is formed by Pt/NaX. Pd catalysts display high selectivity and hydrogenation of the C=C bond in 2-ethylhexanal and are suitable, primarily, for one-stage synthesis of 2-ethylhexanal from butyric aldehyde and H_2 . The study showed that M^{1+} forms of phozhasite catalysts of group VIII metals act like typical bifunctional catalysts in conversion of butyric aldehyde and H_2 . A catalyst of one and the same composition may be monofunctional or polyfunctional depending on the nature of the reagents. Figure 1; references 8: 7 Russian, 1 Western.
[8-2791]

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POSSIBLE GROWTH MECHANISM OF DIAMOND PARTICLES IN AGEING CARBON-METAL SYSTEMS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 284, No 3, 1985
(manuscript received 8 Jun 83) pp 663-665

KRYLOV, V. S. and GANKEVICH, L. T., All-Union Scientific Research
Institute of Metallurgical Machine Construction, Moscow

[Abstract] An analysis was conducted on the thermodynamic parameters of carbon crystallization in conjunction with electron micrographs of cross-sections of C-Ni-Mn systems in relation to system aging. The electron micrographs demonstrated diamond particle outcroppings, ca. 1 μm in size, located either perpendicularly or in parallel to graphite particles. The perpendicular diamond particles represented areas of maximal growth and indicated that the graphite particles served as sites of diamond crystallization. Comparison of the initial stages and after ageing of the system at 550°C for 60 h confirmed previous findings that formation of diamond nuclei takes place on the surface of graphite outcroppings on interaction with the catalyst. The growth of these nuclei is controlled by the rate at which the catalysts diffuse into the graphite phase. Coalescence of diamond particles appears to occur largely within the graphite matrix, with the driving force for the process provided by change in the free energy due to ageing of the carbon material. The ageing process has the effect of enhancing carbon atom mobility on contact with the metallic phase on the surface of the graphite particles. Figures 2; references 10 (Russian).

[038-12172]

STATEMENT AND PRESS CONFERENCE ON NEW U.S. CHEMICAL WEAPONS PLANS

Moscow PRAVDA in Russian 20 Sep 85 p 4

[Abstract] This lengthy article is a report on a September 19 press conference for Soviet and foreign journalists at the USSR Ministry of Foreign Affairs, which was devoted to plans of the USA to begin production of binary chemical weapons. The article includes the text of a statement read at the opening of the press conference by General-Major A. D. Kuntsevich, corresponding member of the USSR Academy of Sciences--who is also identified as an expert of the USSR Defense Ministry--in which he described binary chemical weapons and characterized plans for their production as another attempt by the USA to achieve military superiority over the USSR while creating obstacles to progress in various arms-control negotiations. Also included are responses to journalists' questions by representatives of the USSR Armed Forces General Staff and of the USSR Ministry of Foreign Affairs, and also scientists, who are not identified in the article. The questions concern such things as the danger that will be created by production of binary chemical weapons, why the USA is so interested in this type of weapon, the danger of deployment of these weapons in Western Europe, what effect their deployment would have on negotiations for banning chemical weapons, etc. It is noted at the end of the article that other questions of journalists also were answered at the press conference.

FTD/SNAP/9835

CSO: 1841/63

COAL GASIFICATION

NONFERROUS METAL WASTES AND GASOLINE SYNTHESIS FROM COAL

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 25 Sep 85 p 3

[Excerpt] Krasnoyarsk--Scientists of the Institute of Chemistry and Chemical Engineering of the USSR Academy of Sciences, Siberian Department, have obtained gasoline from lignite using waste products of nonferrous-metallurgy plants.

The formula for transforming this solid fuel into a liquid one has been known to scientists for a long time: the coal must be enriched with hydrogen. Gasoline of high quality can be produced only under high pressure and at high temperatures, however. And the main thing that is needed is a process accelerator--a catalyst.

"In existing processes, ferromolybdenum compounds are used as the catalyst," said Doctor of Chemical Sciences B. Kuznetsov, deputy director of the institute. "But this method has a substantial drawback, despite its effectiveness; molybdenum is quite expensive. This factor becomes decisive in large-scale production. The scientists therefore sought a new and economical catalyst. They decided to use slimes--waste products of non-ferrous-metallurgy plants--for this purpose. The researchers performed dozens of experiments with various slime specimens before their instruments showed that the coal had begun to absorb hydrogen actively. A new composition was thus found which is capable of accelerating the transformation of coal into liquid fuel. The results of the Siberian scientists' research have also been confirmed in a test unit of the USSR Academy of Sciences' Institute of High Temperatures."

FTD/SNAP/9835
CSO: 1841/63

UDC 662.747

CALCULATION OF OPTIMAL PARAMETERS FOR COAL GASIFICATION

Kiev KHIMICHESKAYA TEKHOLOGIYA in Russian No 4, Jul-Aug 85
(manuscript received in final form 4 Apr 85) pp 9-13

ZHOLUDOV, Ya. S. and VOLKOVINSKIY, V. A., Institute of Modeling and
Energy Problems, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] Mathematical techniques were applied to optimization of the various Soviet and Western technologies employed in coal gasification, based on published literature. Parameters that are common to all processes were identified as temperature of pulverized coal gasification, coal particle size, and reaction time. Equations were derived which related the various parameters to one another, and were specifically used in the analysis of the process employed by Texaco and the Kopper-Totzek process. Figures 1; references 21: 9 Russian, 12 Western.
[5-12172]

/9835

UDC 662.222+536

STEADY COMBUSTION OF INITIATING EXPLOSIVES AT HIGH PRESSURE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 282, No 6, 1985
(manuscript received 1 Jun 84) pp 1449-1452

FOGELZANG, A. Ye., YEGORSHEV, V. Yu., PIMENOV, A. Yu., SINDITSKIY, V. P.,
SAKLANTIY, A. R. and SVERLOV, B. S., Moscow Institute of Chemical
Technology imeni D. I. Mendeleev

[Abstract] The first successful steady combustion of selected initiating explosives was obtained at pressures ranging from 0.1 to 40 MPa, employing a technique designed to yield a pore-free substance in order to avoid or preclude factors that may lead to convective situations and, thereby, to explosive events. The experimental approach consisted of preparing the initiating explosives in the form of charges with a relative density of 1.2 to 1.60 g/cm³ with residual pores filled with an inert liquid. Tablets of the explosives were prepared under pressure of 500-600 MPa to a thickness of 0.3-0.4 mm with a 10 mm diameter, and then sectioned into 1 mm wide wafers, and placed into combustion chambers. Tabulated data are provided on the density, pressure range, rate of combustion, and calculated combustion temperature at 10 MPa for diazodinitrophenol, tricycloacetoneperoxide, hexamethyleneperoxidediamine, tetrazene, and cyanurtriazide. It appears that any initiating explosive may be studied in this manner, with the possible exception of lead azide type-initiating explosives. Figures 1; references 8 (Russian).

[007-12172]

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FERTILIZERS

UDC 661.632.12

PRODUCTION OF NITROFOSKA FROM RAKVERE PHOSPHORITES BY NITRIC ACID--SULFATE METHOD

Tallinn IZVESTIYA AKADEMII NAUK ESTONSKOY SSR; KHIMIYA in Russian Vol 34, No 3, 1985 (manuscript received 12 Dec 84) pp 165-169

AASAMAE, E. and VEIDERMA, M., Tallinn Polytechnical Institute

[Abstract] In preceding papers, early stages of nitric acid--sulfate processing of Rakvere phosphorites has been described: decomposition of flotational concentrates of the phosphorites with nitric acid mixed with sulfuric acid or with ammonium sulfate and filtration of the reactive pulp yielding the production solution. In the present paper, the processing of this solution into solid NPK fertilizer (nitrofoska) was described. After evaporation of the filtrate, it was neutralized with NH_3 , KCl was added and the slurry was dried. The NPK fertilizer thus obtained contained 44-50% $\text{N}+\text{P}_2\text{O}_5+\text{K}_2\text{O}$ at a $\text{N}:\text{P}_2\text{O}_5$ ratio being kept at 1:0.8 or 1:0.45, depending on the origin of the starting material: Rakvere or Maardu, respectively. Over 88% of the phosphorus was in water soluble form. References 8: 7 Russian, 1 Western.
[24-7813]

UDC 631.717.5:66.09912

PHYSICOMECHANICAL CHARACTERISTICS OF OXAMIDE-MODIFIED GRANULATED CARBAMIDE

Kiev KHIMICHESKAYA TEKHOLOGIYA in Russian No 4, Jul-Aug 85
(manuscript received 10 Nov 84) pp 7-9

PARKHOMENKO, V. D., SMIRNOVA, Ye. S., PIVOVAROV, A. A. and STEBA, V. K., Dnepropetrovsk Institute of Chemical Technology

[Abstract] The addition of oxamide to a level of 1.0 to 45.0% to carbamide was evaluated in terms of various strength and stability parameters of the resultant granulated fertilizer. The advantages offered by oxamide over other additives (CaO , ZnO , V_2O_5 , NaOH , KCl , NaCl , CaCl_2 , etc.) are that it does not lower the nitrogen content, and exerts a pronounced cementing

effect as indicated by strength and granule stability tests. Additionally important improvements in the fertilizer, ascribed to oxamide, was the diminution in the hygroscopic properties of carbamide, with no caking taking place in samples containing more than 2.5% oxamide. Oxamide was thus shown to be an effective filler for carbamide. Figures 4; references 7 (Russian). [5-12172]

UDC 631.811.98

EFFECTS OF DIGIDREL ON CUCUMBER DEVELOPMENT AND PRODUCTIVITY UNDER GREENHOUSE CONDITIONS

Moscow AGROKHIMIYA in Russian No 8, Aug 85 (manuscript received 26 Nov 84) pp 100-104

ALBA, N. V., DOROFYEVA, L. S., SAPOZHNIKOVA, Ye. V., BARNASHOVA, G. S., LARIONOVA, N. M., VOLKOV, S. P., SEVOSTYANOV, V. S. and ZHIVAYEV, A. M., Mordovian State University, Saransk

[Abstract] An assessment was conducted on the effects of digidrel [sic], an ethylene-emitting agent, on the development and productivity of Syurpriz-66, TSKhA-211, April'skiy and Moskovskiy Ranniy cucumbers cultivated in greenhouses. Treatment of the seedlings with a 0.01% solution of digidrel, equivalent to 5-7 ml per plant, improved productivity without any adverse consequences for the quality of the gherkins. These changes were ascribed to digidrel-induced elevation of inorganic phosphate resulting from activated phosphatases and enhanced phosphate metabolism, which in turn promoted growth and fructification. References 9 (Russian). [042-12172]

UDC 631.811:633.16:633.52

ISOTOPE INDICATOR STUDIES ON MUTUAL INTERDEPENDENCE OF NITROGEN, PHOSPHORUS AND POTASSIUM IN PLANT UPTAKE

Moscow AGROKHIMIYA in Russian No 8, Aug 85 (manuscript received 10 Apr 84) pp 20-24

IVANOV, S. N., VOROSHILOVA, A. I. and SHMIGELSKIY, A. A., Belorussian Scientific Research Institute of Pedology and Agrochemistry, Minsk

[Abstract] Flax K-6 and Elgin barley were employed in isotope-analysis studies to determine the mutual interdependence of nitrogen, phosphorus and potassium in plant uptake. The isotopes included ^{15}N , ^{32}P and ^{85}Rb , the latter serving as a K label in view of the high cost of ^{40}K and the short half-life of ^{42}K . The tabulated findings demonstrated that nitrogen

enhances the uptake of phosphorus and potassium fertilizers, while phosphorus enhances the uptake of potassium fertilizers. Potassium, however, elevated the uptake of nitrogen and phosphorus to an insignificant extent only.

[042-12172]

UDC 631.811.1:633.12

INCORPORATION OF FERTILIZER NITROGEN INTO ALBUMINS OF ALEURONE GRAINS IN
RELATION TO BUCKWHEAT SEED DEVELOPMENT

Moscow AGROKIMIYA in Russian No 8, Aug 85 (manuscript received 26 Jul 84)
pp 15-19

SOKOLOV, O. A. and TIMCHENKO, A. V., Institute of Applied Physics, USSR
Academy of Sciences, Pushchino, Moscow Oblast

[Abstract] A combination of polyacrylamide gel (PEG) electrophoresis and mass spectrometry were used to assess the incorporation of fertilizer-supplied ^{15}N into the albumin fraction of aleurone grains in buckwheat seeds. Under the conditions employed, the albumin component of aleurone proteins of Yubileynaya-2 buckwheat seeds consisted of 10 fractions on PEG, divided into heavy (fractions 1-3), intermediate (4-7) and light (8-10) groupings. A time-course study of ^{15}N incorporation in relation to seed development demonstrated that most of the ^{15}N supplied by the fertilizer went into fractions 4 and 6. Although the total amount of ^{15}N incorporated in the albumin fraction over the developmental period remained invariable, temporal variations were noted in the various fractions. For example, the rate of incorporation into fraction 4 showed a decrease-increase pattern, while fraction 6 was characterized by a decrease-increase-decrease pattern. Fraction 5, on the other hand, showed a continuous decrease from the initial level throughout development. These changes reflected the complexity of metabolic changes occurring in the aleurone granules during seed development. Figures 3; references 16: 1 Belorussian, 15 Russian.

[042-12172]

STUDY OF NITROFOSKA BRAND 15:9:9 OBTAINED AT EXPERIMENTAL PLANT OF
DNEPRODZERZHINSK PRODUCTION ASSOCIATION "AZOT"

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 7, 1985 pp 408-409

LAMP, V. N., PORTNOVA, N. L., ABASHKINA, T. F., DOROSHINA, T. V.,
ELONTYEVA, S. I., VESELKOVA, A. A., BRIZITSKAYA, N. M., KOVTUN, A. A.
and KONYUSHENKO, I. N.

[Abstract] Analysis of nitrofoska 15:9:9 was performed because its synthesis had been changed from a process employing sulfuric acid to one based on ammonium sulfate. Because of the fact that it was impossible to maintain exactly accurate proportions of the reagents at the pilot plant, the composition of the final product varied slightly from batch to batch. Precipitation of calcium sulfate with ammonium sulfate formed dihydrated plaster and not semihydrated crystalline material observed in the other process. During reaction of evaporated ammonized pulp with potassium chloride in presence of $(\text{NH}_4)_2\text{SO}_4 \cdot 3 \text{NH}_4\text{NO}_3$, the plaster is converted to the syngenite $\text{CaSO}_4 \cdot (\text{K}, \text{NH}_4)_2\text{SO}_4$ hydrate. To prevent this, the reaction time of the nitrophosphate solution with ammonium sulfate should be increased (to obtain less reactive large crystals of CaSO_4), the temperature of the precipitation of CaSO_4 should be raised and dry ammonium sulfate should be used instead of its 40% solution.

[9-7813]

/9835

UDC 577.16.004.8

STIMULATION OF METHANOGEN VITAMIN B₁₂ SYNTHESIS BY BETAINE CHLOROHYDRATE ESTERS

Kiev KHIMICHESKAYA TEKHOLOGIYA in Russian No 4, Jul-Aug 85
(manuscript received in final form 26 Dec 84) pp 36-38

KOSHEL, M. I., KHASKIN, I. G., SKIRSTYMONSKIY, A. I. and
DEMCHINSKAYA, L. A., Institute of Microbiology and Virology, Ukrainian
SSR Academy of Sciences, Kiev

[Abstract] Esters of betaine hydrochloride with the general formula $[^+R-CH_2COOR']Cl^-$ where R is a quaternary amine, e.g., pyridine or triethylamine, R' is the alkyls C₇ to C₂₀--were tested for their effectiveness in stimulating vitamin B₁₂ synthesis by methanogens. In both batch and chemostatic conditions an increase in the production of vitamin B₁₂ was observed with 0.0001% esters, the degree depending on the quaternary tertiary amine (triethylamine or pyridine) and the primary or secondary alcohol. In batch cultivation conditions, the vitamin B₁₂ yields were improved 7 to 41% and, in continuous culture, 20 to 40%. References 11: 1 Ukrainian, 10 Russian.

[5-12172]

/9835

UDC 661.842.532.065

EFFECT OF ORGANIC COMPOUNDS ON CRYSTALLIZATION OF CALCIUM SULFATE α -SEMIHYDRATE

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 7, 1985 pp 419-422

IVANITSKIY, V. V. and NESTOR, L. I.

[Abstract] Because of the paucity of literature data on the subject, the goal of this study was to determine the relationship between structure of CaSO_4 semihydrate crystal growth modifiers (SCGM) and their effectiveness. Experiments were performed on hydrothermal treatment of CaSO_4 in presence of various SCGM's showing that malonic acid and its salts appeared to be the best modifiers. This was ascribed to the activity of $-\text{CH}_2$ -group of the malonic acid capable of forming complexes with $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. Crystalline shape of CaSO_4 in relationship to various active centers of SCGM was discussed. In summary, when SCGM's are used with the general structure $\text{R}_1\text{OC}(\text{J})\text{RC}(\text{O})\text{OR}_2$, then with an increase of the hydrocarbon length in R, R_1 and R_2 the effectiveness of SCGM drops; the following is the order of the effectiveness of these radicals: $\text{R} > \text{R}_1 > \text{R}_2$; other groups attached to R have the following order of effectiveness: $\text{OH} < \text{CH}_3 < \text{SO}_3 < \text{Me}$. Figures 4; references 6 (Russian).

[9-7813]

UDC 666.653.2

RELATIONSHIP OF RHEOLOGICAL PARAMETERS OF FERRITE POWDERS TO THEIR BEHAVIOR DURING FORMATION

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 7, 1985 pp 434-435

TESKER, A. M., OLEJNIKOV, N. N., PUTLYAYEV, V. I. and TRETYAKOV, Yu. D.

[Abstract] An attempt was made to establish minimal number of rheological parameters required for description of the behavior of oxide powders during their formation using $\text{N}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ as the test material. Correlation analysis was used to determine which of the rheological parameters had the most critical effect and it was shown that most of them were interrelated, so that it was possible to identify a small number of independent parameters

(factors). Correlation coefficients were calculated for moisture-% and a number of parameters from which three compact groups were identified characterizing the particle surface (fluidity, moisture and specific surface), geometry and strength of aggregates (average size of the aggregates and their dispersion) and volume-mass based properties of the powder (bulk granular density, packed density, average particle size and its dispersiveness). In each group the most significant parameters were isolated: bulk granular density, fluidity and average size of the aggregates. Figures 1; references 4 (Russian).
[9-7813]

/9835

UDC 677.494.742.3:677.862.25:541.183.123.3:677.017

MECHANICAL AND THERMOMECHANICAL PROPERTIES OF HIGH-BASE ANION-EXCHANGE
FIBERS BASED ON POLYPROPYLENE WITH POLYSTYRENE GRAFTS

Moscow KHIMICHESKIYE VOLOKNA in Russian No 4, 1985
(manuscript received 31 Aug 83) pp 28-30

POPOVA, O. P., SHUNKEVICH, A. A., PROKOPCHUK, N. R. and BELOTSEKOVSKAYA, T. N.

[Abstract] The mechanical and thermomechanical properties of fibers obtained by chloromethylation and subsequent amination of polypropylene fibers with polystyrene grafts were studied. The gamma-irradiation used to graft the polystyrene had no effect on the mechanical properties of the polypropylene. Grafting 63% polystyrene to the polypropylene decreased the break tension by a factor of 1.8 and the modulus of elasticity by 25%. The elongation at rupture was slightly increased. Further increases in the polystyrene content decreased the rupture tension but had no effect on modulus of elasticity or rupture elongation. Chloromethylation and amination further reduced mechanical characteristics. These changes are connected with increased linear density. Mechanical stability decreased and rupture force increased with increasing polystyrene content. The thermomechanical properties of the modified fibers were determined by the nature of the grafted polymer. Polystyrene lowered the thermal stability of the graft polymers, while amination increased the softening temperature and increased thermal stability above that temperature. Figures 3; references 9 (Russian).

[358-12126]

ION EXCHANGE PURIFICATION EFFECTIVENESS OF AQUEOUS SOLUTION OF ϵ -CAPROLACTAM

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 7, 1985 p 444

VASHKEVICH, V. V., BONDARENKO, T. G. and YEROSHOV, M. M.

[Abstract] It was shown that proper alteration of cation and anion columns has a significant effect on the purification of aqueous solutions of caprolactams performed at pH value of about 4. The first column should be filled with an anion exchange resin and the second with a cation type resulting in the following sequence: A-C-A A-C-A-C. This shortens the flow-through time and lowers the consumption of NaOH, nitric acid and desalinated water for regeneration purposes. Figure 1; references 5 Russian, (1 by Western authors).
[9-7813]

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NITROGEN COMPOUNDS

UDC 661.185.1

AMPHOLYTIC SURFACTANTS

Tallinn IZVESTIYA AKADEMII NAUK ESTONSKOY SSR: KHIMIYA in Russian Vol 34, No 3, 1985 (manuscript received 29 Oct 84) pp 210-220

FAINGOLD, S. and KUUSK, A., Institute of Chemistry, ESSR Academy of Sciences

[Abstract] Ampholytic surfactants (ASA) represent a small fraction of world's production of the surfacting agents (SA), yet the interest in these compounds is gradually increasing because of a greater variety of active structures being available, because of some of their specific biological properties and due to the possibility of polyfunctional application (especially in the field of cosmetics). In the present paper a number of these ASA's was reviewed based on purported 1500 citations: alkylamniocarboxylic acids, alkylbetains, derivatives of alkylimidazolines, alkylaminoalkanesulfonates and -sulfates, as well as polymeric ASA's. In all cases structures of these representative agents were reported with some characteristic properties and specific applications. References 3: 2 Russian, 1 Western. [24-7813]

UDC 676.1.02.023:547.992.3

LIGNIN BEHAVIOR IN CHLORINATION OF SOFT- AND HARDWOOD CELLULOSE SULFATE. PART 2. UV AND IR SPECTROSCOPY AND ANODAL VOLTAMMETRY OF CHLOROLIGNIN

Riga KHIMIYA DREVESINY in Russian No 4, Jul-Aug 85 (manuscript received 10 May 84) pp 72-75

MOSEYEVA, D. P., SOKOLOVA, A. A., LIKHUSHINA, L. K. and SEMAKOVA, L. A., Lignin Laboratory, All-Union Scientific Industrial Association of the Paper Industry

[Abstract] UV and IR spectroscopies and anodal voltammetry were used to monitor the chemical behavior of lignin as a result of chlorine bleaching

of laboratory-prepared samples of soft- and hardwood cellulose sulfate and spent industrial liquors. The initial stages of chlorination were accompanied by the addition of chlorine to lignin, without disruption of the phenol structure. More extensive bleaching of the sulfated cellulose results in destruction of the aromatic nuclei of lignin. However, chemical differences in the laboratory and industrial products were evident, consisting of the presence of both quaiacyl and pyrocatechol structures of the 'laboratory' chlorolignins, which increased with an increase in the degree of chlorination. The industrial chlorolignins lacked quaiacyl and pyrocatechol groups, presumably due to condensation of the pyrocatechol components to quinoid structures as a result of alkalization. Figures 4; references 7: 1 Russian, 6 Western.
[39-12172]

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UDC 548.736.661.881.1:547.497.1

SYNTHESIS AND MOLECULAR STRUCTURE OF THIOSEMICARBAZIDE (IV). NEW TYPE OF GEOMETRIC ISOMERISM OF COORDINATION COMPOUNDS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 284, Sep-Oct 85
(manuscript received 27 Nov 84) pp 155-158

GERBELEU, N. V., BURSHEYN, I. F., KIOSSE, G. A., FILLIPOVA, I. G.,
BOLOGA, O. A., LOZAN, V. I. and MALINOVSKIY, T. I., academician, USSR
Academy of Sciences, Institute of Applied Physics, MSSR Academy of Sciences;
Institute of Chemistry, MSSR Academy of Sciences, Kishinev

[Abstract] This paper describes and discusses the structure of a complex of oxovanadium (IV) and H_2L , synthesized for the first time. The compound is produced by decantation of warm aqueous solutions containing 1.0 g of $VOSO_4 \cdot 2H_2O$ in 20 ml and 0.1 g H_2L in 20 ml (molar ratio of components 1:1). Slow evaporation of the solution precipitates a light-gray crystalline substance with a yield of 80 percent of the theoretical level. The compound is soluble in water. The structure synthesized reveals simultaneous presence of two geometric isomers of previously unknown type, formation of which becomes possible due to the different mutual disposition of unequal in value, for the donor atoms, branches of the organic ligand. It is assumed that this form of isomery exists in complexes of other metals and H_2L and also in coordination compounds of metals with other type B tripod ligands. Figure 1; references 9: 7 Russian, 2 Western.
[8-2791]

ROLE OF PHASE COMPOSITION OF REACTION SYSTEM DURING HYDROLYTIC
POLYCONDENSATION OF ORGANODICHLOROSILANES

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 7, 1985 pp 444-445

IVANOV, P. V., GELPERIN, N. I. and KIREYEV, V. V.

[Abstract] Study of hydrolytic polycondensation of methylphenyldichlorosilane (MPDS) and diphenyldichlorosilane yielded a characteristic relationship between the selectivity of the process D_{C_1} and MPDS, showing that D_{C_1}

depends on the relationship between aqueous and organic phases. This showed that the hydrolysis of diorganodichlorosilanes (DCS) does not occur at the surface of phase separation nor in one of the phases, but concurrently in two phases of the reaction system. Thus, the reaction route and the composition of the products obtained in hydrolytic polycondensation of DCS are determined by mutual solubility of the components and phase composition of the intermediate system DCS-diorganochlorohydroxysilane-solvent-water. Figure 1; reference 1 (Russian).

[9-7813]

UDC 535.379,547.1'13

NOVEL CHARACTERISTIC OF ORGANOMETALLICS: REDOX CHEMILUMINESCENCE ON
REACTION WITH XeF_2 AND O_2 IN SOLUTION

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 282, No 6, 1985
(manuscript received 2 Aug 84) pp 1385-1389

BULGAKOV, R. G., MAYSTRENKO, G. Ya., YAKOVLEV, V. N., KULESHOV, S. P.,
TOLSTIKOV, G. A., corresponding member, USSR Academy of Sciences, and
KAZAKOV, V. P., Institute of Chemistry, Bashkir Branch, USSR Academy of
Sciences, Ufa

[Abstract] To test the hypothesis that fluorescence is a common feature of reactions between organometallic compounds and oxidizing agents, organic compounds involving groups I-VIII metals were reacted either with XeF_2 (at 300°K) or with O_2 (at 330°K) and the reactions monitored for fluorescence. The tabulated data demonstrate that virtually all the compounds under consideration yielded fluorescence on reaction with the oxidizing agents, with the exception of a few that failed to react with O_2 under the conditions specified. Chemifluorescence was recorded not only with the alkyl and aryl metallic compounds, but also with sandwich compounds, carbonyls, and compounds with metal-metal bonds. Thus, reaction of the organometallics with O_2 or XeF_2 leads to an electronically excited state, with the similarities in the maxima of intensity on reaction with XeF_2 suggesting

the formation of intermediate organoxenon compounds. References 11:
6 Russian, 5 Western.
[007-12172]

UDC 541.67.49:546.97:548.422.27

ESR STUDIES ON ADDITION OF GROUP IV HYDRIDES AND HYDROGEN TO DIPHOSPHINE
SEMIQUINOLATE RHODIUM COMPLEXES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 282, No 6, 1985
(manuscript received 12 Jul 84) pp 1402-1405

ABAKUMOV, G. A., CHERKASOV, V. K., NEVODCHIKOV, V. I. and Academician
RAZUVAYEV, G. A., Institute of Chemistry, USSR Academy of Sciences,
Gorkiy

[Abstract] The addition of group IV hydrides and hydrogen to bis-tri-phenylphosphine-3,6-di-tert-butyl-o-benzosemiquinone rhodium ((3,6-SQ)Rh(PPh₃);I) and to bis-triphenylphosphine-(4,5-dimethoxy-3,6-di-tert-butyl-o-benzosemiquinone) rhodium ((4,5-3,6-SQ)Rh(PPh₃);II) was monitored by ESR spectroscopy. I and II react with gaseous hydrogen at room temperature and atmospheric pressure to yield the adducts (PPh₃)₂H₂Rh(3,6-SQ) (III) and (PPh₃)₂H₂Rh(4,5-3,6-SQ) (IV). The ESR spectra were identical showing that the hydrogen atoms in III and IV are located in the semiquinolate plane and that the two phosphorus nuclei are equivalent and apical in the octahedral complex. HSnBu₃ reacts with I and II to form paramagnetic products stable at -50 to -20°C. The resultant adducts possessed similar ESR spectra, indicating that the hydride fragments were located at the apical positions of the octahedral complex. In reaction with I, only the trans-isomer was formed, whereas, in reaction with II, a cis-isomer was formed with the hydride in the plane of the semiquinolate ligand. Neither I nor II react with triethylgermanium; but form adducts as readily with diethylgermanium as with HSnBu₃ with initial formation of trans-isomers. Figures 3; references 4: 3 Russian, 1 Western.
[007-12172]

UDC 661.718.5

PRODUCTION OF ORGANOALKOXYASILANES BY CONTINUOUS REACTION-RECTIFICATION
METHOD

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 7, 1985 pp 397-398

UTKIN, O. V., UVAROVA, G. A. and UKHTOMSKIY, V. G.

[Abstract] Organoalkoxysilanes are starting materials in production of valuable oligomeric and polymeric silicon organic compounds. One of the

principal production methods is based on esterification of organochlorosilanes with excess of aliphatic alcohols followed by desorption of HCl and rectification of the reaction mixture. This method has many undesirable features. The present study showed that the reaction-rectification method, in which the contact of the reaction mixture with HCl is minimized, leads to higher yields of organoalkoxysilanes because side reactions are avoided. The apparatus for this process consists of a reactor chamber leading to a desorber from which the reaction mixture free of excess HCl reaches the reactor-rectifier filled with glass beads. Using this apparatus, successful production of tetraethoxysilane was achieved. Figure 1.

[9-7813]

UDC 541.488/141.7:535.37

COMPLEX FORMATION IN CRYSTALLINE PHOSPHORS DERIVES FROM ALKYL-AMMONIUM AND BISMUTH HALIDES

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 8, Aug 85
(manuscript received 5 Dec 83) pp 2031-2035

MAMEDOV, A. P. and SHABALINSKAYA, L. A., Institute of Petrochemical Processes, Azerbaijan SSR Academy of Sciences, Baku

[Abstract] Spectrophotometric and luminescent studies were conducted on the formation of $[R_2NH_2]_m BiHal_{3+m}$ (I) and $BiHal_3 \cdot 3R_2NH$ (II) crystalline phosphors in a $R_2NH_2Hal-Bi$ system, where Hal = Cr or Br, and m = 1, 2 or 3. Absorption analysis of the I phosphors revealed electronic transitions characteristic of Bi^{3+} : $1S_0 \rightarrow 3P_1$ (A band), $1S_0 \rightarrow 3P_2$ (B band), and $1S_0 \rightarrow 1P_1$ (C band). The presence of these bands indicated the presence of Bi halide centers in I. The correspondence of the position of the A band in the tetra-, penta-, and hexahalides pointed to the retention of the octahedral coordination of the ligands around the $Bi(III)$ ion. In conjunction with the spectra of II and thermogravimetric analysis, the following series of interconversions were advanced: $2(II) \xrightarrow{t} 2BiHal_3 + 6R_2NH$; $BiHal_3 + H_2O$ (from air) $\rightarrow BiOHal +$

$2HHal$; $2R_2NH + 2HHal \rightarrow 2R_2NH_2Hal$; $BiHal_3 + 2R_2NH_2Hal \rightarrow [R_2NH_2]_2BiHal_5$. The bismuth hexahalides showed the most intense luminescence. In addition, the butyl derivatives were more intensely luminescent than the ethyl derivatives, suggesting that the increase in the length of the alkyl chain and the greater distance between adjacent bismuth halide octahedrons diminishes loss of luminescence due to migration. Figures 4; references 10:

8 Russian, 2 Western.

[013-12172]

/9835

UDC 543.422/547.572

CHLOROPHENOLS ACYLATION BY CHLORANHYDRIDE OF CYCLOHEXANECARBOXYLIC ACID

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR: SERIYA FIZIKO-TEKHNICHESKIKH, KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 2, 1985, pp 66-69

NIYAZOV, A. N., YURCHENKO, N. N. and ATLYYEV, Kh. A.

[Abstract] Results of acylation of isomeric chlorophenols by chloroanhydride of cyclohexane carboxylic acid are presented and discussed. Synthesis of cyclohexylchlorohydroxy phenylketones and chlorophenyl ethers of cyclohexane carboxylic acid without a solvent is achieved by vigorous mixing of the initial components in equimolar amounts. Optimum conditions and some mechanisms of the course of the reaction are established and discussed. Problems of orientation of substituents (a hydroxyl group and chlorine), whose mutual disposition affects the quantity of isomers, are discussed. Study of the biological activity of the compounds obtained showed them to have weak insecticidal and acaricidal properties in attempts to control flies, beetles, mites and ticks. The fungicidal activity in relation to potato blight, cucumber powdery mildew and bean gray rot was lower than the standard activity. Figure 1; references 5 (Russian). [12-2791]

/9835

UDC 531.3

PYROLYSIS OF HYDROCARBON MIXTURES

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 8, Aug 85
(manuscript received 21 Sep 83) pp 1894-1898

KORZUN, N. V., GAGARINA, L. V., BARABASH, V. B. and MAGARIL, R. Z.,
Tyumen Industrial Institute imeni Komsomol

[Abstract] Comparative studies were conducted on the kinetics of pyrolysis of four different mixtures of hydrocarbons at temperatures ranging from 903 to 1013 °K, to determine the reactivities of the C-H bond in relation to its type. Analyses of the rate constants reflected the reactivities of the C-H as follows, taking the reactivity of the primary C-H bond as unity: secondary C-H alkanes adjacent to a carbon atom with a methyl group was equivalent to 3, the secondary C-H bond in other positions had a value of 4.5, and the tertiary C-H bond in alkanes had a value of 10. The C-H bond in cyclohexane and decaline was assigned a reactivity value of 3, and in tetraline on carbon atoms in the beta position to the aromatic ring also a value of 3 (in analogy to decaline); however, the C-H bond in tetraline of the carbon in the alpha position to the aromatic ring was determined to have a value of 5.3. The kinetics of the thermal decomposition of hydrocarbon mixtures differed markedly from the kinetics of individual hydrocarbons, due primarily to changes in the concentration of radicals responsible for the chain reaction. References 21: 10 Russian, 11 Western. [013-12172]

UDC 661.5:547.538.142

SYNTHESIS OF 2,5- AND 3,4-DIMETHYLSTYRENES BY CONDENSATION OF XYLENES WITH ACETALDEHYDE

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 7, 1985 pp 398-400

GUNDER, O. A., SYCHEVA, M. V., KOPINA, I. V., KOBAYASHI, V. S. and
REVINSKIY, V. S.

[Abstract] Condensation of o- and p-xylenes with acetaldehyde yields the expected isomers of dimethylphenylethane (DMPE) and products of further

condensation such as trixylyldiethane and higher hydrocarbons as well as sulfation products. An increase in the reaction temperature from -4 to +6°C increased the yield of DMPE; further elevation reduced its yield drastically, based on the reacted xylene. The initial reaction rate was proportional to initial concentration of acetaldehyde in the acid. The increase in molar ratio of acetaldehyde to xylene increased the yield of DMPE based on the xylene passed through the reaction chamber, but decreased it based on the reacted xylene. All of this indicates considerable formation of side products. Condensation of o-xylene with acetaldehyde yields a mixture of two isomers: 2,3,2',3'- and 3,4,3',4'-DMPE while p-xylene gives only 2,5,2',5'-DMPE. Figures 5; references 10: 9 Russian, (1 by Western author), 1 Western.
[9-7813]

UDC 665.637.5.644.2

EFFECT OF COMPONENT AND GROUP MAZUT HYDROCARBON COMPOSITION ON CATALYTIC CRACKING

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR: SERIYA FIZIKO-TEKHNICHESKIKH, KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 2, 1985 (manuscript received 23 Aug 84) pp 75-78

KHANKULIYEVA, G. R., KARAYEVA, O., SERGIYENKO, S. R. and ERNEPESOV, Kh. N., Institute of Chemistry, Turkmen SSR Academy of Sciences

[Abstract] Experiments with the use of zeolite-containing catalyst, Tseokar on a vertical flow-through device in the 748-798°K temperature range at bulk speeds of 1.5-6 hr⁻¹, are described and discussed. Raw material used in the catalytic cracking experiments was mazut from the Krasnovodsk Petroleum Processing Plant. Composition of gaseous cracking products was analyzed on an LKh M-8 MD chromatograph by aluminum column chromatography. Equations of dependence of yield of basic cracking products on regime parameters, obtained by mathematical processing of experimental data, are presented and discussed. Optimal conditions were found to be T=773°K and bulk speed of 1.5 hr⁻¹. The effect of different groups of hydrocarbons on the catalytic cracking process was discussed. Clear-cut regularities of yield of C₁-C₂ components and total C₄ of cracking gases as a function of temperature and bulk speed are obtained. Figure 1; references 5: 4 Russian, 1 Western.
[12-2791]

OIL-AND-GAS PRODUCTION PROBLEMS ON WESTERN TURKMENISTAN FIELDS AND MEANS OF SOLVING THEM

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR: SERIYA FIZIKO-TEKHNICHESKIKH, KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 2, 1985 (manuscript received 27 Jun 83) pp 79-83

KHASAYEV, A. M., ALLAKHVERDIYEV, R. A. and BAKHISHEV, V. Yu., Azerbaijan Institute of Petrochemistry imeni M. Azizbekov; Turkmenneft Production Association

[Abstract] The need for development of fundamentally new methods of oil and gas extraction to increase recovery from long-exploited deposits in Western Turkmenistan is described and discussed. Attempts to increase extraction involved studies in two directions: improvement of methods of limiting water inflow and increase of effectiveness of methods of intensifying oil and gas extraction. A new technique is proposed for use when working the face zone of a seam; it involves the addition of working fluids with special visco-elastic properties. Effectiveness of this method in stabilizing the level of oil and gas extraction in Turkmenistan deposits is shown in a table and is discussed. Figures 3; references 4 (Russian). [12-2791]

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UDC 532.135:678

HIGHLY ELASTIC RECOVERY OF POLYMER MELTS FOLLOWING MULTILAYER COEXTRUSION

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 284, No 3, 1985

(manuscript received 19 Sep 84) pp 665-669

PANOV, A. K., DOROKHOV, I. N. and KAFAROV, V. V., academician, Ufa Petroleum Institute; Moscow Institute of Chemical Technology imeni D. I. Mendeleyev

[Abstract] Mathematical analysis and experimental studies were conducted on the swelling of multilamellar polymeric systems following coextrusion. Changes in the swelling coefficient were analyzed in relation to the number of layers, extrusion pressure, and variation in the thickness of the components, in order to determine the effects on end geometric dimensions of fabricated articles. Studies with high-density polyethylene, polystyrene, polypropylene and plasticized cable resin showed that in all cases a significant reduction in swelling (15-20%) was obtained with a 5-layer extrusion system in comparison with single-layer extrusion. Evidently, the layers become thinner and on injection one into the other there is a significant drop in normal tensile forces, resulting in a decrease in elastic recovery and postextrusion swelling. Multilayer extrusion, therefore, appears to be a promising technological process for increasing the accuracy of articles fabricated from polymers and in improving their quality. Figures 2; references 4 (Russian).

[038-12172]

UDC 541.64:543.51

STUDY OF THERMODESTRUCTION OF FIBER-FORMING AROMATIC POLYAMIDES USING MASS-SPECTROSCOPY

Moscow KHIMICHESKIYE VOLOKNA in Russian No 4, 1985

(manuscript received 21 Aug 84) pp 14-17

GAL, A. E., PEREPELKIN, K. YE., POZDNYAKOV, O. F., YUDIN, V. S. and GELMONT, M. M.

[Abstract] Homolytic bond cleavage of fiber-forming aromatic polyamides was studied in polymetaphenylene isophthalamide, polyparaphenylene

terphthalate, polyparabenzamide and polyamide benzimidazole, using mass-spectroscopy. The mass-spectroscopy of nineteen low-molecular weight model compounds was used to demonstrate that the structural elements which destabilize the molecule during ionization are primarily the amide groups. The bond between the aromatic and carbonyl groups also tends to cleave. The volatile products of the thermal destruction of the four polymers were found to be similar, varying somewhat in quantitative ratios. 5,4'-Diamino-2-phenylbenzimidazole, 1-isocyano-4-aminophenylene, 1,4'-phenylene-dinitrile, benzonitrile, aniline, benzene, carbon monoxide, carbon dioxide, hydrogen cyanide, water and ammonia were observed. The activation energy of thermal destruction varied from 155 to 270 kJ/mole for the four polymers. The first stage of thermal destruction involves the release of water, solvents, acids and unreacted starting materials. In the second stage the initial structure cleaves to form a new structure which is stable at temperatures over 700°C, and possesses about 50% of the initial mass. Carbon monoxide, 1,4'-dinitrilphenylene and 1-isocyano-4-aminophenylene are formed by monomolecular homolytic reactions. Structural defects arising during heterolytic reactions can serve as sources of thermal cleavage in the macromolecule. References 17: 13 Russian, 4 Western. [358-12126]

UDC 677.071.252.1:534+8

CHANGES IN ACOUSTIC CHARACTERISTICS OF CHEMICAL FIBERS DURING STRETCHING

Moscow KHIMICHESKIYE VOLOKNA in Russian No 4, 1985
(manuscript received 5 Jun 84) pp 18-19

MOLOTKOV, A. P., GLUKHOV, V. A. and ZELENÉV, Yu. V.

[Abstract] The acoustic properties of polypropylene, polyvinyl chloride, polyethylene terephthalate and polyamide fibers were measured directly during stretching using a special instrument which permits the rate of sound propagation in the sample to be determined at temperatures from -150°C to +150°C and deformation rates from 1 to 100 mm/minute. The dependence of sound propagation on stretch multiplicity exhibited a minimum between 1.05 and 1.1%, due to the predominance of disorientation at low deformation and orientation at higher deformation. A formula describing propagation rate in terms of limiting and isotropic sample rates gives results which agree with the experimental data. When the stretching rate is increased from 0.5 to 10 mm/minute the sound propagation rate minimum is shifted to lower multiplicity values. This indicates the relaxation character of the process. Most samples had slightly lower sound propagation rates during the first minute of stretching, except for polyvinyl chloride at stretch multiplicities of 1.85% and 2.2%, where propagation was slightly faster during the first minute. The results indicate the complex combination of several processes which occurs during fiber stretching. Figures 2; references 4: 3 Russian, 1 Western. [358-12126]

DETERMINATION OF INDEX OF DOUBLE REFRACTION IN FIBERS BY SENARMON METHOD

Moscow KHIMICHESKIYE VOLOKNA in Russian No 4, 1985
(manuscript received 28 Feb 84) pp 19-21

SEDOV, A. A.

[Abstract] A method for using the principle of the Senarmon method to determine the index of double refraction in fibers was developed. The method uses the interference order, as indicated by the interference band pattern observed in the fiber with a polarizing microscope. At orienting optical differences of 800-1600 nm, an auxiliary quartz wedge balancer is necessary. The determination may be conducted in either polychromatic or monochromatic light. The method is also capable of determining the sign of the index of double refraction. Best visibility of the interference band pattern is achieved using an immersion fluid with a refractive index close to that of the fiber under study. The method was used to investigate ten types of chemical fibers, with optical differences from 16 to 16,897 nm and indices of double refraction from -0.0009 to 1.0561. Figures 1; references 8 (Russian).
[358-12126]

CHANGE IN PROPERTIES OF OVILAN FIBERS DURING TEXTURIZING

Moscow KHIMICHESKIYE VOLOKNA in Russian No 4, 1985
(manuscript received 21 May 84) pp 32-33

IVANOVA, L. V. and BAUKIN, V. N.

[Abstract] The texturizing of Ovilan-2 viscose fibers was studied by examining all the elemental fibers in six lengths of complex fiber after untwisting. Number of twists, stretchability and degree of winding were found to be distributed in a Gaussian manner. The average number of twists per cm and its dispersion were constant along the length of the fiber, while stretchability and winding degree were not. The dependence of stretchability and degree of winding on number of twists per cm exhibited a conditional character, even though the first two parameters were well correlated. Three types of twists were observed: microtwisted, wave and looped. The features of axial fibers result mainly from compression deformation, while the type of twist observed depends on the location of the elemental fibers in the complex fiber. The underrepresentation of microtwists in calculation of twists per cm causes this latter parameter to be weakly correlated with fiber number and stretchability. The non-uniform degree of stretchability of viscose fibers before twisting must be taken into account when selecting technological twisting parameters. Figures 3; references 7 (Russian).
[358-12126]

STRUCTURE AND MECHANICAL CHARACTERISTICS OF MESOMORPHIC ACETATE FILMS

Moscow KHIMICHESKIYE VOLOKNA in Russian No 4, 1985
(manuscript received 19 Jul 84) pp 34-36

KHANCHICH, O. A., YUNUSOV, B. YU. SOROKIN, V. YE. and SERKOV, A. T.

[Abstract] The submolecular structure of films obtained from isotropic solutions of cellulose diacetate and triacetate via liquid-crystal transitions, as well as the relation of structure to mechanical properties, were studied. Solutions of 8%, 12% and 15% in N-methylpyrrolidone with methylene chloride or methyl ethyl ketone to lower solution viscosity, were used to prepare the films. Increasing the solution concentration from 8% to 12% increased film stability and elongation at rupture. Elongation was maximal in the cellulose diacetate film obtained from a 12% solution in N-methylpyrrolidone and methylene chloride (1:6). This film was characterized by a four-lobed reflex small-angle polarized light scattering pattern, which may be interpreted as scattering from randomly-oriented arrow-like elements. The great rupture elongation of cellulose diacetate fibers and its ease of orientational stretching are connected with the presence of microfibrils. Thermal elongation of unoriented films caused structural rearrangement with axial and some equatorial orientation of the arrow-like structures. When films were formed from 25% solutions heated at 40°C to 180°C, transparency increased markedly, indicating the formation of optically anisotropic structures. The films possessed substantial longitudinal stability, indicating their capacity for fibrilization in a mechanical field. Figures 4; references 4: 2 Russian, 2 Western.
[358-12126]

UDC 53.082.4:547.458.81

EFFECT OF FORMATION RATE ON ULTRASOUND PROPAGATION AND ANISOTROPY OF ACOUSTIC CHARACTERISTICS IN CELLULOSE HYDRATE FILMS

Moscow KHIMICHESKIYE VOLOKNA in Russian No 4, 1985
(manuscript received 14 Sep 84) pp 36-38

SOBOLEVA, O. M. and YUNUSOV, B. KH.

[Abstract] The influence of technological factors on the acoustical properties and anisotropy of cellulose hydrate films was studied. With increasing formation rate, increasing stability and decreasing rupture elongation along the molecular orientation axis were noted. The opposite pattern was observed when ultrasound was propagated in the perpendicular direction. At 45° the results were intermediate. The changes seen in the rate of ultrasound propagation were analogous to the changes in stability, while changes in attenuation coefficient corresponded to those in rupture

ORGANOLANTHANIDE COMPOUNDS AS ACTIVE CENTERS OF STEREOSPECIFIC POLYMERIZATION OF DIENES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 284, Sep-Oct 85

(manuscript received 5 Nov 84) pp 140-142

COLLERSHTEYN, Ye. L., GLEBOVA, N. N., GOLSHTEYN, S. B., ZAVADOVSKAYA, E. N., SHARAYEV, O. K., YAKOVLEV, V. A., TINYAKOVA, Ye. I. and DOLGOPLOSK, B. A., academician, Institute of Petrochemical Synthesis imeni A. V. Topchiyev, USSR Academy of Sciences, Moscow

[Abstract] This report confirms the fact that $RNdCl_2$ type organoneodymium compounds, produced by different methods, catalyze *cis*-polymerization of butadiene and isoprene in the absence of organoaluminum compounds. Experimental data are shown in a table and discussed. Tribenzyl neodymium was synthesized in a diethyl ether solution of $NdCl_3$ and benzyl lithium and transferred into a toluene solution after removal of the ether. Tribenzyl neodymium produced is stereospecific for formation of *trans*-links during butadiene and isoprene polymerization. Trisoligobutadienyl compounds of Nd, Pr and Sm, produced by reaction of oligobutadienyl lithium and anhydrous chlorides of these metals in a hydrocarbon medium, display the same stereospecificity. Addition of the required quantity of HCl , $SnCl_4$, $(C_6H_5)_3CCl$ to tribenzyl neodymium converts *trans*-stereoregulation into *cis*-stereoregulation during polymerization of both butadiene and isoprene. The catalysts involved are much less active in polymerization processes than are systems consisting of NdX_3 and organoaluminum compounds but the experiments do confirm the possibility of producing *cis*-stereoregulated systems based only on metalloorganic compounds of lanthanides in the absence of an organoaluminum component. References 8: 7 Russian, 1 Western. [8-2791]

UDC 541.64:539.3

INTERRELATIONSHIPS BETWEEN DESTRUCTIVE AND RELAXATION PROCESSES IN PLASTIC-ELASTOMER MIXTURES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 282, No 6, 1985

(manuscript received 19 Jul 84) pp 1406-1410

BARTENEV, G. M., MIKITAYEV, A. K. and TKHAKAKHOV, R. B., Institute of Physical Chemistry, USSR Academy of Sciences, Moscow; Institute of High Molecular Weight Compounds, Kabardino-Balkar State University, Nalchik

[Abstract] An analysis was conducted on the relationship between destructive and relaxation processes in a 50/50 (wt%) mixture of polyvinyl

chloride and acrylonitrilebutadiene, based on evaluation of temperature dependence of mechanical losses and rupture strength. Dynamic studies on relaxation characteristics, using induced nonresonant periodic deformation with a frequency of 2.5×10^{-2} Hz, led to determination of the temperature relationships of mechanical loss constant and dynamic modulus of elasticity. The thermodynamic incompatibility of the components was reflected in three maxima of mechanical losses, corresponding to polyvinyl chloride, acrylonitrilebutadiene, and an interphase layer (in which the components are mutually soluble). The behavior of polyvinyl chloride was analogous to that of a carbon filler, suggesting segmental mobility in the interphase. Three maxima were also obtained for rupture stress, corresponding to the three mechanical loss maxima, but lying at lower temperatures. The data were interpreted to indicate that while relaxation processes per se do not lead to destruction of plastic-elastomer mixtures, they affect the rate of destruction. Figures 2; references 12 (Russian).
[007-12172]

UDC 673.057

PREPARATION AND PROCESSING OF COMPOSITE MATERIALS PREPARED FROM POLYETHYLENE AND GRANULATED CHALK

Kiev KHIMICHESKAYA TEKHOLOGIYA in Russian No 4, Jul-Aug 85
(manuscript received 30 May 84) pp 44-47

MAKAROVA, N. A., MNATSAKANOV, S. S., ZALYANTS, G. A., GILIMYANOV, F. G., ZHAROV, A. N., SIVETSKIY, V. I. and PRISTAYLOV, S. O., Kiev Polytechnic Institute

[Abstract] An analysis was conducted on the various factors affecting fabricability of composite materials prepared from low density polyethylene and granulated chalk. Evaluation of the physical mechanical data showed that the use of granulated chalk containing 30 wt% polyethylene wax binding material resulted in optimal chalk dispersion, with the optimal composites containing 30 to 50% of the chalk in the low density polyethylene. A further increase in the concentration of chalk led to deterioration of the mechanical characteristics of the composites. On the basis of the analysis of the physical characteristics of the composites, cursory technical details are outlined for the preparation of granulated chalk with polyethylene wax binder, and for the mixing of the chalk in the polymer. Figures 2; references 4 (Russian).
[5-12172]

EFFECTS OF DISPERSION MEDIUM ON METHACRYLIC ACID COPOLYMERIZATION IN SUSPENSION

Moscow PLASTICHESKIYE MASSY in Russian No 6, 1985 pp 10-12

KURYZHOVA, L. V., KULIKOVA, A. Ye. and KISELEVA, R. L.

[Abstract] An evaluation was conducted on the effects of the nature and concentration of dispersing and salting-out agents in suspension copolymerization of methacrylic acid and methyl methacrylate. The nature of the dispersing agent, polyvinyl alcohol or gipan [sic], had no effect on the chemical or granulometric characteristics of the final polymeric product. With 0.3-2.0% gipan an inverse relationship prevails between gipan concentration and residual methacrylic acid concentration in the aqueous phase, whereas with 0.3-2.0% polyvinyl alcohol there is virtually no effect on the concentration of the acid in the aqueous phase. In addition, in the presence of gipan, up to 1% emulsion copolymer is formed, a figure that is three-fold lower with polyvinyl alcohol. Salts of divalent metals were found most suitable for use as salting-out agents in the copolymerization of methacrylic acid and methyl methacrylate for the elimination of the former, having no effect on the course of polymerization or the state of dispersion. Optimal copolymer yields, ranging from ca. 95-100%, were obtained with 6-8% CaCl_2 . Tabular data are provided on the chemical and granulometric characteristics of the copolymers in relation to copolymerization conditions. Figures 2; references 4 (Russian). [6-12172]

MODIFICATION OF 1,1,2-TRICHLOROBUTADIENE-1,3 WITH ALPHA-CYANOACRYLIC ACID ESTERS

Moscow PLASTICHESKIYE MASSY in Russian No 6, 1985 pp 13-14

POLYAKOVA, A. M., SUPRUN, A. P., KLIMENTOVA, N. V., MAGER, N. A., SUSAKINA, T. I. and SOTNIKOVA, M. A.

[Abstract] In order to obtain novel adhesives, studies were conducted on the modification of 1,1,2-trichlorobutadiene-1,3 (TCB) with ethyl and allyl esters of alpha-cyanoacrylic acid. Under the conditions employed, the copolymers were obtained in 50-90% yields. The viscosity of the various products was in the 0.5-0.96 dL/g range in benzene. The products consisted of white powders with a softening point in the 80-100°C range, and stable to thermooxidative destruction in the 250-350°C range. These polymers were found to be stable in water, soluble in chlorinated and aromatic hydrocarbons, tetrahydrofuran, and in nitromethane. Tabular and graphical data are presented on the physical and

mechanical characteristics of these adhesives, with the notation that they are effective in metal-metal, rubber-rubber, and metal-rubber binding. In general, this approach seems promising as a method of securing novel cold adhesives with properties superior to standard TCB and polycyanoacrylate adhesives. Figures 1; references 6: 4 Russian, 2 Western.
[6-12172]

UDC 678.674:66.095.3:678.01:53

TETRAHALOPHTHALIC ACID-BASED FIRE-RESISTANT RUBBER PRODUCTS

Moscow PLASTICHESKIYE MASSY in Russian No 6, 1985 pp 14-18

GASANOV, G. M., GUSEYNOV, M. M. and BABAYEV, S. B.

[Abstract] A mini review of largely Western literature is presented on the latest advances in the synthesis and chemical characteristics of fire-resistant polymeric products using tetrahalophthalic acids and their various derivatives. Comparative data are provided for the different halogen compounds, the routes of derivative synthesis, and use in the various polymers. An extensive array of structural formulas is included, as well as speculation on the use of the tetrahalophthalic acids in fire-resistant polyurethane foams. References 63: 10 Russian, 56 Western.
[6-12172]

UDC 678.5.06:677.862.552

EFFECTS OF TROPICAL CLIMATE ON DURABILITY OF CONSTRUCTION POLYMERS

Moscow PLASTICHESKIYE MASSY in Russian No 6, 1985 pp 23-24

UMANSKIY, E. S., SHIDLOVSKIY, N. S., STEZHKO, L. L., KASYAN, R. M., SYCHOV, V. S. and RYBAKOV, B. N.

[Abstract] A variety of construction polymers were subjected to tropical climate conditions aboard ships in the Pacific and Indian Oceans for up to 12 months, to assess the effects of sunlight, moisture, and salinity on their durability. Specimens under study included polypropylenes (PP), low and high density polyethylenes (PE), polyamides (PA), styrene-alpha-methyl styrene copolymers (SMS), polystyrenes (PS), Textolite, etc. Analysis of changes in their physical and mechanical properties with time demonstrated that Textolite was virtually unaffected by the tropical climate, but that the other products evidenced significant deterioration. In all cases, direct sunlight significantly accelerated aging. Tabulated data are provided on the modulus of elasticity, stretch-resistance, etc. Figures 1; references 8: 6 Russian, 2 Western.
[6-12172]

EFFECTS OF OLIGOACRYLATE ESTERS ON ADHESIVENESS OF PLASTISOL COATINGS

Moscow PLASTICHESKIYE MASSY in Russian No 6, 1985 pp 24-26

KARPUKHINA, G. V., MOZZHUKHIN, V. B., YUSHKOVA, S. M., GUZEYEV, V. V.
and TAGER, A. A.

[Abstract] Studies were conducted on the mechanism by which introduction of oligoacrylate esters (OAE) into polyvinyl chloride plastisols (PVC) improves adhesiveness. Determinations of the effects of α,ω -bis(trimethacrylpentaerythritol)adipinate, triethylene glycol dimethacrylate, and pentaerythritol triacrylate provided data indicating that the OAE compounds exert their effects by increasing the rigidity of the coatings. The increase in the deformability component is ascribed solely to polymerization of the OAE, provided that the concentration of the oligomer is sufficient to form a dense three-dimensional lattice in the matrix of the plasticized PVC after heat treatment. In general terms, the concentration of OAE required is on the order of 12 to 15%. Figures 2; references 8 (Russian).
[6-12172]

GAS SEPARATION BY POLYTETRAFLUOROETHYLENE MEMBRANES

Moscow PLASTICHESKIYE MASSY in Russian No 6, 1985 pp 33-34

TIGINA, O. N. and GOLUBEV, I. F.

[Abstract] Determinations were made of the permeability (P), diffusion (D) and solubility (σ) constants for carbon dioxide, methane, helium, and nitrogen in polytetrafluoroethylene membranes to determine the suitability of these membranes for gas separation. Studies with membranes 0.32×10^{-3} m thick, ca. 60% crystallinity, and a density of ca. 2.15 g/cm^3 led to determination of P, D and σ over a pressure range (p) of 0.5 to 15 MPa at 280-340°K. The data showed that methane reacted with the membranes much more significantly than did CO₂ or N₂. Analysis of D(p), P(p) and $\sigma(p)$ relationships demonstrated that gas transfer across the polytetrafluoroethylene membranes is largely due to diffusion. The membranes were found particularly efficient in separation CO₂ and N₂, since the coefficient of separation at 280°K and 3 MPa pressure was equal to ca. 50 under these conditions. Figures 2; references 8: 6 Russian, 2 Western.
[6-12172]

CHARACTERISTICS OF POLYCAPROAMIDE POWDERS IN RELATION TO PROCESSING
METHODOLOGY

Moscow PLASTICHESKIYE MASSY in Russian No 6, 1985 pp 56-57

PISHEV, D. I., GANKOV, N. P., ANGELOVA, N. I., ZULAMSKI, K. G., IVANOV, G. K. and DIMOV, K. D., Bulgarian Peoples Republic

[Abstract] Studies were conducted on methods yielding polycaproamide powders with optimal characteristics for spray application, involving the selection of appropriate reprecipitation solvent and conditions. Trials with reprecipitation from ϵ -caprolactam and lactam oligomer concentrate (LOC; 87-98% ϵ -caprolactam, 0.30-0.35% caprolactam oligomers, 2-3% water), in combination with granulometric and electron microscopic particle-size analysis, showed that the product best suited for spray application was obtained with ϵ -caprolactam reprecipitation. Commencing with a starting polycaproamide with a density of 2.35 [sic], slow reprecipitation with cooling from ϵ -caprolactam resulted in a narrow-fraction (>90% 63-200 μ m diameter) of spherical-granule powder showing high bulk density (0.352 g.cm³) and pour rate (6.01 g/sec). Figures 1; references 7: 6 Russian, 1 Western.

[6-12172]

CARBON-PVC PLASTICS

Moscow PLASTICHESKIYE MASSY in Russian No 6, 1985 p 64

BURYA, A. I. and ZAKHAROV, A. V.

[Abstract] Carbon-fiber reinforced PVC plastics were prepared by mixing both components in the presence of ferromagnetic particles, and subjecting the latter to intense chaotic movement by exposure to 0.08 tesla rotating electromagnetic field. The homogenous composites, after removal of the ferromagnetic particles by magnetic separation, were subjected to compression molding at 436 °K and 44 MPa. Prior to testing the samples were annealed at 288°K for 6 h. Tests showed that compositions containing 30-40% carbon fiber were markedly superior to PVC alone in terms of hardness, wear resistance, thermal stability, heat conductivity, impact toughness, and stretch resistance. On-site testing of agricultural machine parts made from such composites containing 20-30% carbon fiber demonstrated that their wear resistance exceeded that of conventional materials. Figures 1; references 4 (Russian).

[6-12172]

CHEMISTRY OF DIENES AND THEIR DERIVATIVES. PART 24. SYNTHESIS OF MIXED BROMOCHLORO DERIVATIVES OF BUTADIENE

Yerevan ARMYANSKIY KHIMICHESKIY ZHURNAL in Russian Vol 38, No 7, 1985
(manuscript received 7 Dec 83) pp 433-438

PAPAZYAN, N. A., AVAGYAN, S. P. and MKRYAN, G. M. (deceased), 'Nairit'
Scientific Production Association, Yerevan

[Abstract] Details are presented on sequences of brominations and dehydrobrominations and dehydrochlorinations for the preparation of mixed bromochloro derivatives of butadiene. The approaches used resulted in the synthesis of compounds such as 1-bromo-2-chloro-, 3-bromo-1,2-dichloro-, 1-bromo-2,3-dichloro-, 1,3-dibromo-2-chloro- and 3-bromo-1,1,2-trichloro-1,3-butadienes. In analogy to 1,1,2,3-tetrachloro-1,3-butadiene, 3-bromo-1,1,2-trichloro-1,3-butadiene also failed to polymerize under conventional conditions. References 11: 7 Russian, 4 Western.
[034-12172]

/9835

SYNTHESIS OF STRONTIUM FERRITES IN ACCELERATED ELECTRON BEAM

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 284, No 2, 1985
(manuscript received 9 Oct 84) pp 413-415

TKACHENKO, Ye. V., AKSELROD, N. L., VORONIN, A. P., GRIBKOV, O. S. and
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University imeni A. M. Gorki Sverdlovsk

[Abstract] Mixtures of strontium carbonate and iron (III) oxide were prepared designed to form the following compounds: $\text{Sr}_3\text{Fe}_2\text{O}_6$, Sr_2FeO_5 , $\text{Sr}_3\text{Fe}_4\text{O}_9$, $\text{Sr}_7\text{Fe}_{10}\text{O}_{22}$, $\text{Sr}_4\text{Fe}_6\text{O}_{13}$, SrFe_2O_4 and $\text{SrFe}_{12}\text{O}_{19}$. The samples were heated to various temperatures and ground, showing that the synthesis of strontium ferrites is accompanied by oxidation and formation of SrFeO_{3-x} . The most stable products obtained in the $\text{SrO-Fe}_2\text{O}_3$ system are $\text{Sr}_7\text{Fe}_{10}\text{O}_{22}$ and $\text{SrFe}_{12}\text{O}_{19}$. Solid phase synthesis of strontium ferrite is a complex, long and multistage process. One possible way to speed it up is to perform it under thermal radiation conditions which speed up the process considerably without changing its mechanism. In addition, this is a single stage process requiring no crucibles and additional milling and yet yielding the product at least as clean as the starting materials. Figures 2; references 10: 4 Russian, 6 Western.
[20-7813]

MECHANISMS OF RAPID OPTICAL TRANSITIONS IN BENZENE AND ITS DERIVATIVES

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 8, Aug 85
(manuscript received 19 Mar 84) pp 1952-1956

IOGANSEN, L. V., All-Union Correspondence Institute of Textile and
Light Industry, Moscow

[Abstract] The model of collective π -electron motion [Iogansen, LV, Dokl. AN SSSR, 189: 281, 1969] is used to account for the observed monomeric absorption at ≤ 700 nm and excimeric absorption at ≤ 530 nm by benzene and its derivatives after nano- or picosecond UV flashes. The former phenomenon is interpreted as representing a transition from quasisymmetrical oscillations of the basic electronic state to a lower-lying singlet π -electron level of the benzene ring ($E = 1.68$ eV). The latter phenomenon is understood to represent a transition from a $E = 1.04$ eV energy level to a state corresponding to the transition of a single π -electron to an adjacent benzene ring. Therefore, an energy of excitation at the $E = 1.04$ eV level can lead to chemical transformations in the gaseous state since the lifetime of this level can be expected to be greater in the gaseous state than in the liquid state (100 picoseconds). The hypothesis can be experimentally tested by studying gas-phase reactions involving benzene and its derivatives following irradiation with slow 1.2 eV electrons. Figures 1; references 22: 15 Russian, 7 Western.
[013-12172]

/9835

UDC 678.4.065:629.114.2

IMPROVEMENTS IN TIRE QUALITY FOR AGRICULTURAL TECHNOLOGY

Moscow KAUCHUK I REZINA in Russian No 8, 1985 pp 4-6

BELKOVSKIY, V. N.

[Abstract] To meet the challenges of the 12th Five-Year Plan the Soviet tire industry will have to markedly expand in capacity and provide the agricultural sector with a new variety of tires. However, significant progress has already been made in the last 10 years, especially in providing radial tires for tractors. In fact, at trials conducted in Nebraska (USA) Soviet tractors K-701, T-501K and MTZ-80 equipped with Soviet radials 28,1R2,6, 21,3R24 and 15,5R38 represented one of the best cost-effective combinations. Soviet production of radial tractor tires increase 1.8-fold in the last decade and have been estimated to account for the savings of some 40 million rubles a year when used on the Belarus' tractor. In addition, to better serve the agricultural sector the tire manufacturing plants are being upgraded with new equipment and technologies to keep pace with the demand.

[25-12172]

UDC 678.4.033:664

ADVANCES IN RUBBER RESEARCH FOR BUTTERFAT EQUIPMENT IN FOOD INDUSTRY

Moscow KAUCHUK I REZINA in Russian No 8, 1985 pp 19-21

VERSHKAYN, R. R., VALYUKH, T. A. and YAKOVLEVA, V. N.

[Abstract] A variety of rubbers were tested for their stability to heat, hardness characteristics, and release of toxic substances to determine their suitability for use in butterfat processing equipment. Experimental studies were conducted on swelling and other behaviors on exposure to sunflower oil and spermaceti at 90°C for up to 30 days. On the basis of the results, SKN-40 rubber (synthetic butadiene-styrene rubber) was selected for further evaluation. The results demonstrated that optimum compositions of SKN-40 for the use intended consisted of samples prepared with charcoal fillers and polyethylene plasticizers. Use of activated

charcoal had the additional advantage of reducing or eliminating the migration of acrylonitrile out of the samples under the testing conditions used. References 3 (Russian).
[25-12172]

UDC 678.063.539.371

EFFECT OF CHEMICAL MODIFIERS ON ELASTIC HYSTERESIS OF SKI-3-01 TIRE RUBBER

Moscow KAUCHUK I REZINA in Russian No 8, 1985 pp 23-24

PICHUGIN, A. M. and SHVARTS, A. G.

[Abstract] Studies were conducted on the effectiveness of a variety of chemical modifiers used in tire rubber SKI-3-01 (synthetic isoprene rubber) that had been vulcanized with a sulfenamide M system containing dithiodimorpholine. The effects of the modifiers on the elastic hysteresis of SKI-3-01 was found to depend on the conditions of use and the type of filler employed. However, in all cases minimal losses due to hysteresis were encountered in systems filled with activated charcoal P245 and the combination of modifiers PNDFA + MFBM. In the case of rubber filled with charcoal P514, optimal results were obtained with modifiers PNDFA + RU. References 4 (Russian).
[25-12172]

UDC 678.04+547.729

2,2-PENTAMETHYLENE-4-ALKOXY(ARYLOXY)METHYL-1,3-DIOXOLANES: NOVEL PLASTICIZERS FOR COLD-RESISTANT RUBBERS

Moscow KAUCHUK I REZINA in Russian No 8, 1985 pp 28-29

OSOSHNIK, I. A., CHERNOUSOVA, N. N. and LEGACHEVA, V. V.

[Abstract] Trials were conducted with a series of 2,2-pentamethylene-4-alkoxy(aryloxy)methyl-1,3-dioxolanes to determine their suitability as plasticizers for butadiene-nitrile rubbers. Determination of the various physical parameters were related to cold resistance, with special emphasis placed on the results of stress(stretch)-strain testing at -30 to -25°C. The dioxolanes in question were found to alter the physical characteristics significantly, with the optimal agents for the production of butadiene-nitrile rubber intended for use at -30°C identified as 2,2-pentamethylene-4-octoxy(nonoxy)methyl-1,3-dioxolanes. References 10: 9 Russian, 1 Western.
[25-12172]

EFFECTS OF ENVIRONMENTAL TEMPERATURE AND LOAD CONDITIONS ON AUTOMOBILE TIRE WEAR

Moscow KAUCHUK I REZINA in Russian No 8, 1985 pp 32-34

KNOROV, V. I. and KNOROV, A. V.

[Abstract] Both elevated environmental temperature and load conditions can contribute significantly to car and truck tire wear. In order to have a quantitative criterion for the assessment of such factors, a wear coefficient was defined by means of the following equation: $K = [\ln(U_1/U_2)]\Delta T$, where K is the coefficient of wear, U_1 and U_2 represent wear rates at two different temperatures (T_1 and T_2 , respectively), and $\Delta T = T_1 - T_2$. On the basis of experimental runs conducted on a circular track 20-35 m in radius at a constant velocity of 20-30 km/h, the use of the equation permits evaluation of the rate of the wear after a 2 to 3 km run. Figures 1; references 3: 2 Russian, 1 Western.

[25-12172]

MODIFICATION OF SYNTHETIC POLYISOPRENE WITH AMINO ACIDS AND PROTEINS

Moscow KAUCHUK I REZINA in Russian No 8, 1985 pp 38-42

POTAPOV, Ye. E., SHERSHNEV, V. A., TUTORSKIY, I. A. and YEVSTRATOV, V. F.

[Abstract] Several different approaches are reviewed for the introduction of amino acids and proteins into polysioprene in order to obtain products with improved characteristics approximating those of natural rubber. On the basis of physical and chemical analysis of the products and their mechanical properties, optimum products were obtained with polyisoprenes epoxidated, with for example, perbenzoic acid. The improved characteristics were ascribed to greater macromolecular orientation and crystallization within the elastomer. In the case of studies with SKI-3 (synthetic isoprene rubber) best results were obtained with modification of the isoprene in alkaline aqueous solutions with small quantities of high molecular weight protein fragments. Figures 4; references 15: 9 Russian, 6 Western.

[25-12172]

UDC 678.544.4:66.018.6

COLOR INDEX OF ACETYL CELLULOSE THERMOPLASTICS

Moscow PLASTICHESKIYE MASSY in Russian No 6, 1985 pp 30-31

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[Abstract] An analysis was conducted on the factors affecting the color index of acetyl cellulose thermoplastics in the process of molding and extrusion. Evaluation of the data on the relationship between optical density of the raw materials from different sources and the concentration of carbonyl and carboxyl groups showed a positive correlation between these two factors. The color index for wood acetyl cellulose thermoplastic was greater than for cotton thermoplastic, and in the case of both preparations could be diminished by processing at temperatures below 200°C. At temperatures exceeding 200°C the color of the thermoplastic and articles fabricated from it increased. The latter phenomenon was ascribed to the formation of additional carboxyl groups at 210-230°C which, in addition to elevating the color index, also intensify destructive processes as a result of their reactivity. Figures 2; references 8 (Russian). [6-12172]

UDC 547.458.82

CELLULOSE ESTERS OF NITROFURAN SERIES CARBOXYLIC ACIDS: SYNTHESIS AND PROPERTIES

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(manuscript received 22 Feb 84) pp 23-25

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[Abstract] In order to prepare new cellulose fibers with antimicrobial activity, studies were conducted on the synthesis and testing of cellulose

esters with nitrofurans carboxylic acids. The esters were synthesized by reacting cellulose with the acid chlorides of 3-(5'-nitro-2'-furyl)acrylate (I) or 2-[2'-(5"-nitrofuryl-2")-vinyl]-4-carboxyquinoline (II) for 1-20 h at 80-120°C in dimethylformamide. The degree of substitution increases with the temperature and duration of the reaction. Hydrolysis of esters I and II at 37°C in 0.05 M phosphate buffer, pH 7.2, showed that I is hydrolyzed at a faster rate than II with a rate constant of $9.6 \times 10^{-7} \text{ sec}^{-1}$, while a four-fold lower rate constant of $2.1 \times 10^{-7} \text{ sec}^{-1}$ was calculated for II. Petri dish microbial susceptibility testing showed a 10 mg sample of ester I (containing 6.5% of the acid substituents) and of ester II (7.2% acid groups) yielded respective zones of inhibition of 3 and 2 mm with *Staphylococcus aureus* P-209. These observations indicate that linkage of nitrofurans to cellulose via an ester bond can yield effective antimicrobial cellulose derivatives. Figures 2; references 5 (Russian). [39-12172]

UDC 547.458.81

EFFECT OF DEGREE OF SUBSTITUTION ON STABILITY OF CYANOETHYLCARBOXYALKYL-CELLULOSES TO THERMOOXIDATIVE HYDROLYSIS

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[Abstract] In view of the susceptibility of carboxymethylcellulose to thermal hydrolysis, an attempt was made to prepare novel derivatized celluloses with increased stability to thermooxidative hydrolysis. A series of cyanoethylcarboxyalkylcelluloses were synthesized by the reaction of carboxymethylcellulose with acrylonitrile in benzene and sodium hydroxide. Analysis of thermodestruction demonstrated that stability of the compounds increased with an increase in the number of cyanoethyl groups introduced into the cellulose molecule, and decreased with carboxyalkyl substitution in the cellulose ethers. The effective energies of activation for thermal hydrolytic destruction of the cyanoethyl-carboxyalkylcelluloses ranged from 53.6 to 75.4 kJ/mole. Figures 5; references 6 (Russian). [39-12172]

EFFECT OF MODIFICATION CONDITIONS OF LIGNIN BY AM-2 ON COMPOSITION AND CHARACTERISTICS OF END PRODUCTS

Riga KHIMIYA DREVESINY in Russian No 4, Jul-Aug 85
(manuscript received 28 Mar 84) pp 87-91

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[Abstract] Studies were conducted on the effects of conditions employed for the modification of lignin by AM-2, as a means of introducing Si into lignin, on the chemistry and thermal stability of the final product. Standard conditions of modification were employed, with the temperature of the process maintained either at 130°C or 200°C. Specific chemical and physical data on the products are summarized in tabular and graphical forms, and demonstrate that at 200°C AM-2 predominantly interacts with lignin via all three functional groups, i.e., the two ethoxy groups and one amino group hydrogen. As a result, extensive cross-linkage is formed which imparts greater thermal stability to the products formed at 200°C. Figures 3; references 6 (Russian).
[39-12172]

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